

5.5B WS

Date _____ Period _____

Find the exact value of each.

1) $\sin \frac{19\pi}{12}$

2) $\cos 285$

3) $\cos -\frac{5\pi}{12}$

4) $\cos \frac{13\pi}{12}$

5) $\sin \frac{11\pi}{18} \cos \frac{7\pi}{18} + \cos \frac{11\pi}{18} \sin \frac{7\pi}{18}$

6) $\frac{\tan \frac{10\pi}{9} - \tan \frac{13\pi}{36}}{1 + \tan \frac{10\pi}{9} \tan \frac{13\pi}{36}}$

7) $\sin \frac{2\pi}{9} \cos -\frac{\pi}{36} - \cos \frac{2\pi}{9} \sin -\frac{\pi}{36}$

8) $\frac{\tan 11 + \tan 124}{1 - \tan 11 \tan 124}$

Simplify.

9) $\cos -\theta \cos 2\theta - \sin -\theta \sin 2\theta$

10) $\sin -2x \cos -5x + \cos -2x \sin -5x$

11) $\cos -2u \cos u + \sin -2u \sin u$

12) $\cos -3v \cos 3v + \sin -3v \sin 3v$

Verify each identity.

13) $\cos (\theta + 180) = -\cos \theta$

14) $\cos (180 - \theta) = -\cos \theta$

$$15) \tan(\theta + 180) = \tan \theta$$

$$16) \tan(\theta - 180) = \tan \theta$$

Use the half-angle identities to find the exact value of each.

$$17) \sin 75^\circ$$

$$18) \cos 157.5^\circ$$

Find the exact value of each.

$$19) \cos \theta = \frac{3}{5} \text{ where } 0 \leq \theta < 90$$

Find $\sin 2\theta$

$$20) \cos \theta = \frac{3}{5} \text{ where } 270 \leq \theta < 360$$

Find $\sin 2\theta$

Verify each identity.

$$21) \cos^2 x(1 - \cos 4x) = \sin^2 2x(1 + \cos 2x)$$

$$22) \frac{\sin 2x}{2\cos^2 x - 1} = \tan 2x$$

$$23) \frac{1 - \tan^2 x}{\cos 2x \sec x} = \frac{1}{\cos x}$$

$$24) \frac{1 + \cos 2x}{\tan 2x + \sin 2x} = \frac{\cos 2x}{2\sin x \cos x}$$

Answers to 5.5B WS (ID: 1)

$$1) \frac{-\sqrt{6} - \sqrt{2}}{4}$$

$$2) \frac{\sqrt{6} - \sqrt{2}}{4}$$

$$3) \frac{\sqrt{6} - \sqrt{2}}{4}$$

$$4) \frac{-\sqrt{6} - \sqrt{2}}{4}$$

$$5) 0$$

$$6) -1$$

$$7) \frac{\sqrt{2}}{2}$$

$$8) -1$$

$$9) \cos \theta$$

$$10) \sin -7x$$

$$11) \cos -3u$$

$$12) \cos -6v$$

$$\begin{aligned} 13) \cos(\theta + 180) \\ &= \cos \theta \cos 180 - \sin \theta \sin 180 \\ &= \cos \theta \cdot -1 - \sin \theta \cdot 0 \\ &= -\cos \theta \end{aligned}$$

$$\begin{aligned} 14) \cos(180 - \theta) \\ &= \cos 180 \cos \theta + \sin 180 \sin \theta \\ &= -\cos \theta + 0 \sin \theta \\ &= -\cos \theta \end{aligned}$$

$$\begin{aligned} 15) \tan(\theta + 180) \\ &= \frac{\tan \theta + \tan 180}{1 - \tan \theta \tan 180} \\ &= \frac{\tan \theta + 0}{1 - \tan \theta \cdot 0} \\ &= \tan \theta \end{aligned}$$

$$\begin{aligned} 16) \tan(\theta - 180) \\ &= \frac{\tan \theta - \tan 180}{1 + \tan \theta \tan 180} \\ &= \frac{\tan \theta - 0}{1 + \tan \theta \cdot 0} \\ &= \tan \theta \end{aligned}$$

$$17) \frac{\sqrt{2} + \sqrt{3}}{2}$$

$$18) -\frac{\sqrt{2} + \sqrt{2}}{2}$$

$$19) \frac{24}{25}$$

$$20) -\frac{24}{25}$$

$$21) \cos^2 x(1 - \cos 4x) \quad \text{Use } \cos 4x = 1 - 2\sin^2 2x$$

$$2\cos^2 x \sin^2 2x \quad \text{Use } \cos 2x = 2\cos^2 x - 1$$

$$\sin^2 2x(1 + \cos 2x) \quad \blacksquare$$

$$22) \frac{\sin 2x}{2\cos^2 x - 1} \quad \text{Use } \cos 2x = 2\cos^2 x - 1$$

$$\frac{\sin 2x}{\cos 2x} \quad \text{Use } \tan 2x = \frac{\sin 2x}{\cos 2x}$$

$$\tan 2x \quad \blacksquare$$

$$23) \frac{1 - \tan^2 x}{\cos 2x \sec x} \quad \text{Use } \cos 2x = \cos^2 x - \sin^2 x$$

$$\frac{1 - \tan^2 x}{\sec x \cdot (\cos^2 x - \sin^2 x)} \quad \text{Decompose into sine and cosine}$$

$$\frac{1 - \left(\frac{\sin x}{\cos x}\right)^2}{\frac{1}{\cos x}(\cos^2 x - \sin^2 x)} \quad \text{Simplify}$$

$$\frac{1}{\cos x} \quad \blacksquare$$

$$24) \frac{1 + \cos 2x}{\tan 2x + \sin 2x} \quad \text{Decompose into sine and cosine}$$

$$\frac{1 + \cos 2x}{\frac{\sin 2x}{\cos 2x} + \sin 2x} \quad \text{Simplify}$$

$$\frac{\cos 2x}{\sin 2x} \quad \text{Use } \sin 2x = 2 \sin x \cos x$$

$$\frac{\cos 2x}{2 \sin x \cos x} \quad \blacksquare$$